

It is claimed:

1 1. In a tunable receiver, the improvement comprising:
 2 a plurality of tracking filters, each tracking filter
 3 having an input and an output, each tracking filter having a
 4 center frequency that is digitally tunable over a respective
 5 frequency range;
 6 a mixer;
 7 a first plurality of switches, each coupled to the input
 8 of a respective tracking filter to couple an RF signal to a
 9 selected one of the tracking filters;
 10 a second plurality of switches, each coupled to the output
 11 of a respective tracking filter, to couple an RF signal from
 12 the selected one of the tracking filters to the mixer to
 13 convert the RF frequency to a predetermined frequency.

1 2. The improvement of claim 1 wherein the predetermined
 2 frequency is an IF frequency.

1 3. The improvement of claim 1 wherein the predetermined
 2 frequency is a baseband frequency.

1 4. The improvement of claim 1 further comprising a
 2 controller coupled to the first and second plurality of
 3 switches and to the plurality of tracking filters, the
 4 controller being responsive to control instructions to select
 5 and tune any one of the tracking filters in accordance with a
 6 respective control instruction.

1 5. The improvement of claim 4 wherein each tracking
 2 filter comprises a plurality of tuning elements, each
 3 switchable into or out of a tracking filter circuit, the

4 controller also being coupled to control the switching of
5 tuning elements into or out of each respective tracking filter
6 circuit, the controller tuning each respective tracking filter
7 by switching tuning elements into or out of the respective
8 tracking filter circuit responsive to respective control
9 instructions.

1 6. The improvement of claim 5 further comprising a
2 memory storing predetermined tracking filter calibration
3 information, the controller being responsive to respective
4 control instructions to control the switching of tuning
5 elements into and out of the respective tracking filter circuit
6 in accordance with the predetermined tracking filter
7 calibration information.

1 7. The improvement of claim 6 wherein the plurality of
2 tracking filters, the mixer, the first plurality of switches,
3 the second plurality of switches and the memory are on a single
4 integrated circuit.

1 8. The improvement of claim 6 wherein the tracking
2 filters are inductance - capacitance tracking filters, and
3 wherein the tuning elements are capacitances.

1 9. The improvement of claim 8 wherein values of the
2 capacitances are in a binary progression.

1 10. The improvement of claim 9 wherein the tracking
2 filters, the mixer, the first plurality of switches, the second
3 plurality of switches and the memory are on a single integrated
4 circuit.

1 11. The improvement of claim 9 wherein the inductances
2 are discrete components and the rest of the tracking filters,
3 the mixer, the first plurality of switches, the second
4 plurality of switches and the memory are on a single integrated
5 circuit.

1 12. The improvement of claim 1 wherein the tracking
2 filters are filters configured to pass frequencies of a
3 selected channel and suppress image frequencies of the selected
4 channel.

1 13. The improvement of claim 12 wherein the mixer is an
2 image rejection mixer.

1 14. The improvement of claim 13 wherein the image
2 rejection mixer is configured to also suppress undesired
3 conversion of signals by harmonics of a local oscillator.

1 15. The improvement of claim 1 wherein the predetermined
2 frequency is a baseband frequency, and the tracking filters are
3 band pass filters for passing frequencies of a selected channel
4 and suppressing frequencies outside the selected channel.

1 16. The improvement of claim 15 wherein the mixer is
2 configured to suppress predetermined harmonics.

1 17. The improvement of claim 1 wherein the mixer is an
2 image rejection mixer, and further comprised of a local
3 oscillator coupled to the controller, the controller
4 controlling the frequency of the local oscillator responsive to
5 the control instructions to provide the predetermined IF output

6 of the image rejection mixer independent of the tuning of the
7 tracking filters.

1 18. The improvement of claim 17 further comprising a
2 memory storing predetermined tracking filter calibration
3 information, the controller being responsive to respective
4 control instructions to control the switching of tuning
5 elements into or out of the respective tracking filter circuit
6 in accordance with the predetermined tracking filter
7 calibration information.

1 19. The improvement of claim 18 wherein the tracking
2 filters are inductance - capacitance filters and wherein the
3 tracking filters other than the inductances, the image
4 rejection mixer, the first plurality of switches, the second
5 plurality of switches, the controller, the local oscillator and
6 the memory are on a single integrated circuit.

1 20. The improvement of claim 19 wherein at least one of
2 the inductances is on the single integrated circuit.

1 21. The improvement of claim 19 wherein at least one of
2 the inductances is a printed inductance on a printed circuit
3 board.

1 22. A television receiver comprising:
2 a preselect filter, the preselect filter being tunable to
3 pass VHF frequencies and suppress UHF frequencies; or to pass
4 UHF frequencies and suppress VHF frequencies;
5 first and second pluralities of switches;

6 a plurality of tracking filters, each tracking filter
7 having an input and an output, each tracking filter having a
8 center frequency that is digitally tunable over a respective
9 frequency range for passing a selected television channel and
10 suppressing the television channel image frequencies;
11 an image rejection mixer;
12 a local oscillator coupled to the mixer; and,
13 a controller;
14 the first plurality of switches each being coupled to the
15 input of a respective tracking filter;
16 the second plurality of switches each being coupled to an
17 output of a respective tracking filter to controllably couple
18 an output of one of the tracking filters to the mixer;
19 the controller being coupled to the preselect filter and
20 the first and second pluralities of switches, the plurality of
21 tracking filters and the local oscillator and responsive to
22 channel selection control instructions to tune a respective
23 tracking filter, to pass a television RF signal through a
24 respective preselect filter, the respective tracking filter,
25 and the mixer to shift the RF frequency of the channel
26 selection to a predetermined IF frequency.

1 23. The receiver of claim 22 wherein the receiver is on a
2 single integrated circuit.

1 24. The receiver of claim 22 wherein the tracking filters
2 comprise inductance - capacitance filters with one or more
3 discrete inductances, and wherein the rest of the receiver is
4 on a single integrated circuit.

1 25. The receiver of claim 22 wherein the outputs of the
2 preselect filter are coupled to the input of the first
3 plurality of switches through an amplifier, and the outputs of
4 the second plurality of switches are coupled to the image
5 rejection mixer through a second amplifier.

1 26. The receiver of claim 22 wherein each tracking filter
2 comprises inductance - capacitance filters having a plurality
3 of selectable capacitances and tunable by coupling one or more
4 of the capacitances into the tracking filter, the receiver
5 being further comprised of a memory storing predetermined
6 calibration information for the tracking filters, the
7 controller tuning respective tracking filters responsive to the
8 channel selection control signal using the predetermined
9 calibration information.

1 27. The receiver of claim 26 wherein the receiver is on a
2 single integrated circuit.

1 28. The receiver of claim 27 wherein the capacitances
2 associated with each tracking filter have capacitance values in
3 a binary progression.

1 29. The receiver of claim 26 wherein the tracking filters
2 comprise one or more discrete inductances, and wherein the rest
3 of the receiver is on a single integrated circuit.

1 30. The receiver of claim 29 wherein the capacitances
2 associated with each tracking filter have capacitance values in
3 a binary progression.

1 31. A method of operating a television receiver

2 comprising:

3 providing channel select control instructions to an
4 integrated circuit, and in response to the control instructions
5 and on the integrated circuit;

6 digitally tuning a respective tracking filter in
7 accordance with the channel selected by the channel select
8 control instructions;

9 setting the frequency of a local oscillator coupled
10 to a mixer to shift an RF frequency corresponding to the
11 channel selected to a predetermined intermediate
12 frequency;

13 directing a television RF signal to the respective
14 tracking filter; and,

15 mixing the output of the respective tracking filter
16 with the frequency of the local oscillator to shift the RF
17 frequency of the selected channel to the intermediate
18 frequency.

1 32. The method of claim 31 wherein the respective
2 tracking filter is tuned to suppress image frequencies for the
3 channel selected.

1 33. The method of claim 32 wherein the output of the
2 respective tracking filter is mixed with the frequency of the
3 local oscillator using an image rejection mixer.

1 34. The method of claim 33 wherein the image rejection
2 mixer is configured to suppress certain harmonics.

1 35. The method of claim 33 wherein the respective
2 tracking filter is tuned by switching one or more capacitors
3 into a tracking filter circuit.

1 36. The method of claim 35 wherein the capacitors have
2 capacitances in a binary progression.

1 37. The method of claim 35 wherein the respective
2 tracking filter is tuned in response to channel select
3 instructions in accordance with predetermined tracking filter
4 calibration data stored on the integrated circuit.

1 38. The method of claim 31 further comprised of filtering
2 the television RF signal to suppress UHF or VHF frequencies
3 responsive to channel select instructions before directing the
4 television RF signal to the respective tracking filter.

1 39. The method of claim 35 wherein the tracking filters
2 are inductance - capacitance filters using one or more discrete
3 inductors not on the integrated circuit.

1 40. The method of claim 35 wherein the tracking filters
2 are inductance - capacitance filters on the integrated circuit.

1 41. A method of operating a television receiver
2 comprising:
3 providing channel select control instructions to an
4 integrated circuit, and in response to the control instructions
5 and on the integrated circuit;
6 digitally tuning a respective tracking filter to pass
7 the frequencies of the channel selected and to suppress

8 image frequencies by switching one or more capacitors into
9 a respective tracking filter circuit;

10 setting the frequency of a local oscillator coupled
11 to a mixer to shift an RF frequency corresponding to the
12 channel selected to a predetermined intermediate
13 frequency;

14 filtering a television RF signal to suppress UHF or
15 VHF frequencies dependent on whether the channel selected
16 is a VHF or a UHF frequency channel, respectively;

17 directing the filtered television RF signal to the
18 respective tracking filter; and,

19 mixing the output of the respective tracking filter
20 with the frequency of the local oscillator to convert the
21 RF frequency of the selected channel to the intermediate
22 frequency and to suppress image frequencies.

1 42. The method of claim 41 wherein the mixing is
2 performed by an image rejection mixer.

1 43. The method of claim 42 wherein the image rejection
2 mixer is configured to suppress certain harmonics.

1 44. The method of claim 41 wherein the capacitors have
2 capacitances in a binary progression.

1 45. The method of claim 41 wherein the respective
2 tracking filter is tuned in response to channel select
3 instructions in accordance with predetermined tracking filter
4 calibration data stored on the integrated circuit.

1 46. The method of claim 41 wherein the tracking filters
2 are inductance - capacitance filters using one or more discrete
3 inductors not on the integrated circuit.

1 47. The method of claim 41 wherein the tracking filters
2 are inductance - capacitance filters on the integrated circuit.